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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/598,502

09/01/2006

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6549

270 7590 11/12/2008
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EXAMINER

SHEVIN, MARK L

ART UNIT

PAPER NUMBER

1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/598,502	Applicant(s) NAKAMURA ET AL.	
	Examiner Mark L. Shevin	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/01/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Status

1. Claims 1, 4, 11, and 12 filed as a preliminary amendment on September 1st, 2006, are pending.

Priority

2. Applicants' claim to foreign priority of Japanese patent application 2004-055989, filed March 1st, 2004, has been recorded.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted September 1st, 2006 in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner. Please refer to applicants' copy of the 1449 form submitted herewith.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1, 4, 11, and 12** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "...with "few" surface defects..." in claims 1 and 4 is a relative term which renders the claim indefinite. The term "few" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the

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invention. Looking to the instant specification for clarification of "few", Table 1 shows that the claimed surface processing method, Processing Method 1, produces "few" particles, in contrast to the "many" particle produced by alternative surface processing methods. The 10 micron defect density (defect/cm²) is used but this is not linked to the presence of "few surface defects" as claim 1 requires that such surface defects resulting from machine work do not exist.

Furthermore, claims 1 and 4 state that the sputtering targets comprise substances without ductility in a highly ductile matrix. To the Examiner, it appears that intermetallic compounds, oxides, carbides, and carbonitrides clearly are considered by Applicants to not have ductility while a melted and rolled Co-Cr-Pt-B alloy does have ductility. Furthermore, the Vickers hardness of the precipitated phases and the Co-Cr-Pt-B matrix seems to be used as demarcating highly ductile vs. substances without ductility even though hardness is only indirectly related to ductility.

5. **Claims 4, 11, and 12** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 states that "...an area of 1 mm to 10 mm..." was cut from the target surface and that an area of "...1 μ m to 50 μ m..." was polished however this steps are indefinite as area is expressed in a length unit squared (i.e. 1 mm² or 1 μ m²). It is not clear if a depth, area, or volume is removed in the cited processing steps of cutting and polishing.

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Joint Inventors

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '623** (JP 2002-069623 – Machine translation).

JP '623:

Ueno, drawn to a Co-Cr-Pt-B based sputtering target having a fine and uniform microstructure (Abstract), teaches a Co-Cr-Pt-B target by providing dispersed boride precipitates in a Co-Cr-Pt-B matrix, the coercive force and dispersion of magnetic properties in a film produced by the sputtering target are stabilized and homogenized (para 0013).

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The grain size of the target may be made smaller by faster cooling during casting, for example, by casting a thinner ingot (para 0019). Hot rolling is also preferred to control the microstructure of the cast target (para 0020).

The Co-Cr-Pt-B target is made by casting and hot-rolling with conditions shown in Table 1.

Ueno thus teaches a sputtering target with a composition comprising Co-Cr-Pt-B, which is prepared by melting (casting) and rolling (hot rolling) which contains "other substances without ductility" (boride) but does not teach the volume ratio, Vickers hardness, or average diameter of these precipitates, the Vickers hardness of the matrix phase, nor the presence of defects of 10 microns or more resulting from machine work.

Ueno also does not explicitly teach that there are "few surface defects".

Regarding claim 1, it would have been obvious to one of ordinary skill in sputtering target manufacture, at the time the invention was made, to form a Co-Cr-Pt-B sputtering target with few surface defects prepared by melting and rolling with the claimed microstructure of a ductile matrix and relatively less ductile precipitates as JP '623 teaches the formation of a substantially identical product of a Co-Cr-Pt-B sputtering target by the identical process of casting and rolling and thus one of ordinary skill would have a reasonable expectation of success in producing the same resultant microstructure with the claimed precipitate amount, precipitate size, and Vickers hardness. From MPEP 2112.01: Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or

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obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

The sputtering target of JP '623 has does not state the presence of surface defects nor the presence of machining work that would produce "defects of 10 μ m resulting from machine work" thus the prior art reads on "with few surface defects" and "wherein defects of 10 μ m resulting from machine work do not exist."

7. **Claims 4 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '623** as applied to claim 1 above, in view of **JP '125** (JP 2002-208125 – Machine translation), **Yamakoshi** (US 6,153,315), and **Kano** (US 5,460,793).

The disclosure of JP '623 was discussed in the rejection of claim 1 above, however JP '623 did not teach cutting or polishing the surface of the sputtering target.

JP '125:

JP '125, also drawn to a Co-Cr-Pt-B sputtering target, teaches there is a relationship between the surface roughness of a target and the sputtered film deposited on a substrate (para 0004 – 0007) and that the dispersion in magnetic properties of deposited Co-Cr-Pt type layers could be minimized by reducing the surface roughness of the finishing sputtering target to less than 1.50 microns (para 0009 and 0012).

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After casting and rolling, the surface is finished by cutting on a lathe (para 0003) and surface roughness was changed by altering the feed rate of the cutting bit on the lathe (para 0014, 0023, and 0030).

Yamakoshi:

Yamakoshi, drawn to a method of manufacturing a sputtering target which provides excellent uniformity in film thickness and low incidence of occurrence of nodules and particles (col. 1, lines 5-10), teaches that variation in film thickness and the production of particles and nodules are all attributable to conditions of the target surface (col. 1, lines 23-40).

In particular, Yamakoshi determined that the formation of nodules and particles are promoted by residual materials from processing tools such as turning (lathe) tools which remain on the surface due to abrasion of the tools during machining as well as residual abrasives (col. 2, lines 45-55).

In manufacturing a sputtering target, machining, polishing, and chemical etching are generally used to smooth a surface for controlling surface roughness (col. 4, lines 15-20) and that it is necessary to reduce the thickness of a surface damage layer produced by machining to 50 μm or less (col. 4, lines 34-40).

Use a diamond turning tool can reduce the surface roughness effectively to this end without needing further wet polishing or chemical polishing (col. 4, lines 51-58), however conventional polishing methods can be used to further reduce surface roughness and the thickness of a surface damaged layer (col. 4, line 66 - col. 5, line 2).

Kano:

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Kano, drawn to the manufacture of metal silicide sputtering targets that give off a minimum of particles (col. 2, lines 20-25), teaches that the formed sputtering targets are machined to final shape and dimension and have a deformed layer removed and the surface smoothed by a number of methods including polishing (col. 7, lines 5-15). 20 μm – 100 μm are removed from the target strain-free and along with microstructure control, was effective in controlling early-stage particle generation (col. 7, lines 16-20 and 24-34).

Regarding claim 4, it would have been obvious to one of ordinary skill in sputtering target manufacture, at the time the invention was made, to subject the cast (melted) and rolled sputtering target of JP '623 to primary cutting work to remove 1 mm to 10 mm from the surface and then subsequently removing 1 μm to 50 μm by polishing as JP '125 taught that the dispersion in magnetic properties of deposited Co-Cr-Pt type layers could be minimized by reducing the surface roughness of the finishing sputtering target to less than 1.50 microns (para 0009 and 0012) and that after casting and rolling, the surface is finished by cutting on a lathe (para 0003) and surface roughness was changed by altering the feed rate of the cutting bit on the lathe (para 0014, 0023, and 0030). A skilled machinist would be able to adjust the area removed from a rough sputtering target depending on the desired target shape, size, surface profile, and surface roughness. In fact, Kano taught that the formed sputtering targets are machined to final shape and dimension (col. 7, lines 5-15).

As for the subsequent polishing step following machining, Yamakoshi taught that conventional polishing methods can be used to further reduce surface roughness and

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the thickness of a surface damaged layer after machining (col. 4, line 66 - col. 5, line 2) while Kano taught a deformed layer was removed and the surface smoothed by a number of methods including polishing (col. 7, lines 5-15) where 20 μm – 100 μm are removed from the target strain-free. This, along with microstructure control, was effective in controlling early-stage particle generation (col. 7, lines 16-20 and 24-34). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed range of material removed from the target surface through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art (Kano), discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding claim 12, JP '125 made it clear (para 00030 that cutting was performed on a lathe with a cutting tool (para 0003), while Yamakoshi added that machining should be performed with a diamond turning tool (a cutting tool) (col. 4, lines 51-58 and col. 4, line 66 - col. 5, line 2).

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '623** in view of **JP '125, Yamakoshi**, and **Kano**, as applied to claims 1, 4, and 12 above, in further view of **Hatwar** (US 4,895,592).

The disclosures of JP '623, JP ' 125, Yamakoshi, and Kano were discussed above, however none of the references taught that polishing was performed with sandpaper or grindstone having a rough abrasive grit size of #80 to #400.

Hatwar:

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Hatwar, drawn to high-purity substantially defect-free sputtering target materials and a method of making them (col. 1, lines 8-12), teaches that the surfaces of the target were polished clean using 240, 320, 400, and 600 grit emery papers (sandpaper) (col. 5, lines 42-51).

Regarding claim 11, it would have been obvious to one of ordinary skill in sputtering target manufacturing, at the time the invention was made, to polishing the sputtering targets of JP '623 processed by the method disclosed in the rejection of claims 1, 4, and 12 above using sandpaper or grindstone with a rough grit of #80 to #400 as Yamakoshi and Kano suggested that the target be polishing after machining to further refine the surface roughness and Hatwar teaches a specific example of a polishing process to clean the surface of the targets with the goal being to produce "defect-free sputtering targets".

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Parkhe: US 2007/0245463 A1

Nakamura: US 2007/0187236 A1

-- Claims 1, 4, 11, and 12 (All pending) are rejected

-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

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All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

10-598,502
November 7th, 2008